Meteorologische Zeitschrift, December 1893.—Comparison of mercurial barometers with boiling-point thermometers, by Colonel H. Hartl. The author has made several comparisons with the above-mentioned instruments since 1876, and finds that properly constructed and verified thermometers form very good substitutes for barometers, and are capable of giving very accurate determinations of air pressure, especially where it is a question of differences of pressure, rather than of absolute values. They are very useful as a check on the aneroid, and the author considers them indispensable for travellers who wish to determine heights of mountains.—On the determination of differences of temperature and humidity between forest and field, by Dr. J. Schubert. A series of observations was made at Eberswalde during 1892 with carefully exposed instruments, the result being that the author considers that much of the difference hitherto found to exist may be due to imperfect exposure of the instruments, and to the times at which the observations were taken. He advocates further observations, with the use of the aspiration hygrometer, by which a free circulation of the air about the bulbs is ensured.

IN the number of the *Botanical Gazette* for December 1893, Mr. H. L. Russell completes his interesting account of the bacterial flora of the Atlantic Ocean in the vicinity of Woods Holl, Mass. He finds that bacteria exist in the mud of the ocean-bottom in large numbers, and that they multiply there freely, although they are not so numerous as in fresh water. The geographical distribution of the species is often extensive, and their vertical range exceeds that of the majority of the higher forms of life. The following new species are described:—*Bacillus limicola*, *B. pelagicus*, *B. litorosus*, and *B. maritimus*. Mr. M. A. Carleton describes a series of experiments on the germination of the spores of Uredineæ, especially in reference to the effects on the process of different chemicals. In the number for January 1894, Prof. Conway Macmillan proposes the terms archenema, protonema, and metanema, for the gametophytic structures below the ferns. Mr. A. Schneider describes the symbiosis of algæ and bacteria in the tubercles on the roots of *Cycas revoluta*. The bacteria belong to the genus *Rhizobium*. Although the roots are abundantly covered with many different kinds of algæ, the only species found in the cells of the tubercles was a *Nostoc*, probably *N. commune*. This abounds in the palisade-cells, where the *Nostoc*-colonies appear to take the place, and to serve the function of chloroplastids.

IN the *Journal of Botany* for February, Mr. Jesse Reeves describes the development of the stem and leaves of *Physiotium giganteum*, which differ from other acrogenous *Jungermannieæ* in the remarkable peculiarity of having a 2-sided instead of a 3-sided apical cell.—The Rev. W. Moyle Rogers adds yet three more new species (?) to the already long list of British *Rubi*, viz. *R. mollissimus*, *R. Powellii*, *R. britannicus*.

WITH the number for January 1894, the *Nuovo Giornale Botanico Italiano* commences its new series as the organ of the Italian Botanical Society, under the editorship of Prof. Arcangeli. The first number consists exclusively of papers on Italian botany.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 1.—"The Action of Heat upon Ethylene." By Vivian B. Lewes. From the work of the earlier observers, the text-books have accepted the equation

$$1.\ C_2H_4 = C_2 + 2H_2$$

as representing the decomposition which takes place when ethylene is subjected to a very high temperature, whilst, on the evidence of the work done by Marchand, and Buff and Hoffman, they represent the change taking place at a lower temperature by the equation

$$2.\ C_2H_4 = C + CH_4.$$

Berthelot, however, has come to the conclusion that two molecules of ethylene split up at a moderate temperature into acetylene and ethane.

The author has made an investigation upon the action which takes place at definite temperatures upon the ethylene, the products of decomposition being as quickly as possible removed from the heated zone.

The gas being passed through 140 mm. of heated tube, no change takes place until a temperature of 800° C. is reached, when traces of acetylene are observed; between 800° and 900° C. the acetylene increases in quantity, and large quantities of methane are generated, accompanied by liquid products. This action increases until just below 1200° C. when hydrogen begins to appear amongst the products of decomposition, whilst the moment the liberation of hydrogen commences, carbon also is deposited; and the formation of oil decreases until close upon 1500° C. when the decomposition of the ethylene is practically complete, and the products of decomposition are mainly hydrogen with some undecomposed methane, and a copious deposit of carbon.

When the products of decomposition of the ethylene are heated together for some time, ethane also is produced, but splits up at 900° C. into ethylene and hydrogen,

$$C_2H_6 = C_2H_4 + H_2.$$

Analyses of the products of decomposition show that the primary action of heat upon ethylene may be represented by the equation

$$3C_2H_4 = 2C_2H_2 + 2CH_4;$$

whilst the final decomposition is as represented by previous observers,

$$C_2H_4 = C_2 + 2H_2,$$

and that between these two extremes there occur a large number of interactions due to the polymerisation of the acetylene formed from the ethylene, and also at higher temperatures from the methane, according to the equation

$$2CH_4 = C_2H_2 + 3H_2.$$

February 1.—"On Hollow Pyramidal Ice Crystals." By Dr. Karl Grossmann and Joseph Lomas.

February 8.—"Researches on the Germination of the Pollen Grain and the Nutrition of the Pollen Tube." By Prof. J. Reynolds Green.

The whole of the researches described in the paper may be summarised as under:—

(1) Diastase and invertase are both present in pollen grains and can be extracted from them by the same treatment as has been found effectual in the cases of seeds and foliage leaves. The relative quantities vary a good deal; while some pollens contain both, others possess only one, which may be either of the two.

(2) At the onset of germination the amount of both diastase and invertase is usually considerably increased. In one species examined this increase was preceded by a primary diminution. When the pollen grain has lost the power of germinating, the quantity of diastase has considerably decreased.

(3) The pollen tube is nourished during its growth by plastic reserve material derived from two sources, the store of material in the grain itself, and a further store deposited in the style.

(4) The reserve store of the pollen grain consists of different materials in different species: starch, dextrin, cane sugar, maltose, and glucose being the forms in which it is found.

(5) The store in the style consists usually of the same carbohydrates, with the exception of dextrin.

(6) The style itself contains enzymes to assist in preparing the reserve materials for absorption by the pollen tube, while the latter excretes the same ferments during its progress down the conducting tissue.

(7) The absorption of food material appears to be one cause of the increase of enzyme found to occur during the germination.

(8) This absorption of food material is usually so active that the reserve store of the pollen grain is often largely increased by a temporary deposition, either in the grain or its tube, of some of the absorbed sugar in the form of starch.

(9) There is a certain amount of evidence pointing to the existence of zymogens in some pollens, particularly such as germinate in a faintly acid medium.

February 15.—"On the Straining of the Earth resulting from Secular Cooling." By Charles Davison.

In this paper the problem as to the total volume of the earth's crust folded and crushed above the surface of zero strain is considered on the supposition that the coefficient of dilatation is not constant, but increases with the temperature. By this means it has been found that, after 100 million years, the depth of the surface of zero strain is 7·79 miles, the total volume of crust-folding about 6,145,000 cubic miles, and the mean thickness of the layer formed by spreading it over the whole earth 164·7 feet. This result is much larger than that obtained when the coefficient of dilatation is taken as constant.

If the conductivity increases with the temperature, or if the material which composes the earth's interior be such that the conductivity and coefficient of dilatation are greater in it than in the surface rocks, or if initially the temperature increased with the depth, these figures must be still further increased. It follows, therefore, that calculations as to the alleged insufficiency of the contraction theory to produce mountain ranges are at present inadmissible.

"Chemical Analysis of the Meteoric Stone found at Makariwa, near Invercargill, New Zealand, in the year 1886." By L. Fletcher, F.R.S.

The results of a microscopic examination of this meteorite by Prof. Ulrich have already been published. Mr. Fletcher has now completed the chemical analysis of the stone, and in this paper gives a detailed account of the method and his observations, for the convenience of future analysts of such bodies.

The interest of the investigation is not in the mineralogical results, but in the study of a composite method applicable to the most complicated meteoritic chemical analysis, namely, that of a partially-rusted meteoric stone.

Chemical Society, February 1.—Dr. Armstrong, President, in the chair.—The following papers were read:—Note on the liberation of chlorine during the heating of a mixture of potassium chlorate and manganic peroxide, by H. McLeod. Brunck has recently stated that oxygen prepared by heating a mixture of potassium chlorate and manganese dioxide, contains ozone but not chlorine. The author now shows that the reverse of this is true, the gas containing chlorine but not ozone.—The examination of some recent freezing-point determinations, by S. U. Pickering. The differences between the results of the freezing-point determinations made by the author and H. Jones are apparently due to inaccurate calibration of the thermometer employed by the latter.—Salts of dehydracetic acid, by J. N. Collie and H. R. Le Sueur. The salts of dehydracetic acid have the general composition $C_8H_9O_5M$; on heating at 145° they lose water, and the residual salts then have the composition $C_8H_7O_4M$. This water may be water of crystallisation; the question as to whether dehydracetic acid is a lactone or not, is hence still unanswered.—A new method of producing carbon tetrabromide, by J. N. Collie. A very large number of organic compounds yield carbon tetrabromide when heated with a strong solution of sodium hypobromite.—Metallic derivatives of acetylene. Mercuric acetylide, by M. Travers and R. T. Plimpton. Mercuric acetylide is a white explosive powder, and probably has the composition $3C_2Hg,H_2O$.—Synthesis of indene, hydrindene, and some of their derivatives, by W. H. Perkin, junr., and E. Révay. On heating barium hydrindenecarboxylate, indene, and not hydrindene, is obtained; the indene, however, seems to be isomeric with ordinary indene.

Mathematical Society, February 8.—Mr. A. B. Kempe, F.R.S., President, in the chair.—At the request of Lord Kelvin, P.R.S., Mr. J. J. Walker, F.R.S., exhibited and described Lord Kelvin's models of his "Tetrakaidecahedron." Votes of thanks were passed to Lord Kelvin and to Mr. Walker. A conversation ensued, in which Messrs. S. Roberts, F.R.S., Forsyth, F.R.S., MacMahon, F.R.S., Elliott, F.R.S., Colonel Cunningham, R.E., and the President took part.—Abstracts were communicated of the following papers:—On a class of groups defined by congruences, by Prof. W. Burnside, F.R.S., and some properties of the uninodal quartic and quintic having a triple point, by Mr. W. R. W. Roberts. Most of the properties of the curves, discussed by Mr. Roberts, are derived by the aid of Abelian integrals.

Linnean Society, February 15.—Prof. Stewart, President, in the chair.—Mr. W. B. Hemsley exhibited some germinating seeds of *Lemna* and some flowering plants of *Lemna gibba*, upon which, in his absence, some remarks were made by Mr. C. H. Wright. From the observations made it was suggested that, although *Lemna minor* and *L. gibba* are usually regarded as distinct, they are respectively the male and female plant of one species. On behalf of the Director of the Royal Gardens, Kew, Mr. C. H. Wright exhibited and made some remarks upon a collection of native plants from the neighbourhood of Cape Town, which had been presented to the Herbarium by Miss Yorke, and which was remarkable for the skilful way in which the natural colours of the flowers had been preserved.—On behalf of the Rev. J. G. Tuck, of Tostock Rectory, Bury St. Edmunds, there was exhibited a hybrid between the common house sparrow and the tree sparrow (*Passer montanus*), which had been taken near Bury on January 13 last. Only one instance of a similar wild hybrid was known to have been previously captured, although two or three instances were on record of the two species interbreeding in aviaries.—Mr. J. C. Willis gave an abstract of a paper on the "Natural History of the Flower" (part ii.), in which he dealt with the mode of fertilisation in *Brodiæa ixioides*, S. Watson, *Stanhopea tigrina*, Bateman, *Pimelia decussata*, R. Br. var. *diosmæfolia*, *Cotyledon umbilicus*, L., *Hydrolea spinosa*, L., and *Ziziphora capitata*, and made some remarks on cleistogamy in *Salvia Verbenaca*, L. A discussion followed, in which Dr. D. H. Scott, Prof. Reynolds Green, and Mr. A. B. Rendle took part.—The Secretary read a paper by Miss D. F. Pertz, on hygroscopic movements connected with seed-dispersal, in which the author partially reviewed the literature of the subject, and detailed the method of observation adopted by previous workers and by herself.

Zoological Society, February 20.—Prof. G. B. Howes in the chair.—A report was read, drawn up by Mr. A. Thomson, on the insects bred in the Insect-house during the season of 1893. Examples of seventeen species of Bombyces, twenty of Diurnal Lepidoptera, and twenty-four of Nocturnal Lepidoptera had been exhibited during the past season, of which many had not been shown in former years. Amongst these were specimens of the fine insect *Actias mimosæ*, from south-east Africa, hatched from cocoons presented by the Rev. H. A. Junod.—Mr. Oldfield Thomas called attention to the skin of a Giraffe from Somaliland, sent for exhibition by Mr. Rowland Ward, and pointed out its differences from the South African Giraffe.—A communication was read from Dr. R. W. Shufeldt, giving particulars of the methods used in preparing specimens of certain Invertebrates for public exhibition employed in the U.S. National Museum.—Mr. Sowerby read a communication forwarded to him by Dr. O. F. von Moellendorff, giving an account of a collection of Land-Shells from the Samui Islands, Gulf of Siam. These Land-Shells were referred to thirty-three species, of which many were described as new to science.—A communication from Dr. D. Sharp, F.R.S., contained a list of Hemiptera Heteroptera of the families *Anthocoridæ* and *Ceratocombidæ*, collected by Mr. H. H. Smith in the island of St. Vincent, with descriptions of new genera and species, prepared by Prof. P. R. Uhler, upon specimens submitted to him by the West Indian Committee.—Mr. O. Thomas read the third of his contributions towards our knowledge of the mammals of Nyasaland, based, as the two former, on specimens forwarded to the British Museum by Mr. H. H. Johnston, C.B., H.B.M. Commissioner in British Central Africa. The present paper contained remarks on thirty-five mammals, of which two were described as new, and were named respectively *Lepus whytei* and *Procavia johnstoni*.—A communication from Dr. R. W. Shufeldt gave an account of the conclusions to which he had arrived respecting the affinities of the birds of the order Steganopodes.

Royal Meteorological Society, February 21.—Mr. R. Inwards, President, in the chair.—The following papers were read:—Temperature, rainfall, and sunshine at Las Palmas, Grand Canary, by Dr. J. Cleasby Taylor. The author gave the results of his observations during the five years 1889–93. The island of Grand Canary occupies a position midway between the African continent and the most western of the Canary group. The mountain peaks rise to a little over 6000 feet, and are about twenty miles from the coast. The chief town and port of the island, Las Palmas, is consequently free from the influence of the mountains. The diurnal range of temperature fluctuates considerably with the variations in wind and sunshine. With a southerly wind (which usually dies down at sunset) the range is increased, but the greater part of the increase is due to a higher day temperature. With northerly winds persisting after sunset, the range may be very slight, particularly if the day has been cloudy. The sea temperature is dependent on causes outside the limits of the archipelago; local presence or absence of sunshine does not cause any difference. A boisterous northerly wind, with a high sea, may cause the temperature to fall quicker than usual, or, if the temperature is rising, to check the rise; but any sudden variation is very rare. The rainfall is not great, though it is spread over a large number of days, the average yearly amount being 8·90 inches. The greater part of the rain falls during October to January, while the period from June to September is practically rainless.—Report on the phenological observations for 1893, by Mr. E. Mawley. This was a discussion of the observations made on the flowering of plants, appearance of insects, and the song and nesting of birds. The year 1893 was in complete contrast to its predecessor, being very forward throughout the United Kingdom. The February and March plants were later than usual in blossoming, especially in the colder parts of our Islands, but after this the dates were everywhere in advance of the average, and during the height of the flowering season the departures from the mean were often considerable.—Comparative observations with two thermometer screens at Ilfracombe, by Mr. W. Marriott. Some exception having been taken to the thermometer screen which has been in use at Ilfracombe for a number of years past, a Stevenson screen was placed at a distance of 60 feet from the old screen in October, 1892, since which date simultaneous observations in the two screens have been made daily at 9 a.m. The results of this comparison show that the temperature deduced from the two sets of observations agrees very closely, the old screen being only 0°·3 higher than the Stevenson.

Cambridge.

Philosophical Society.—February 12.—Prof. Hughes, President, in the chair.—On a suggested case of mimicry in the mollusca, by Mr. A. H. Cooke. The species concerned were *Strombus mauritianus*, L., and *S. luhuanus*, L., the shells of which differed from those of all other *Strombus* in their close resemblance to the shell of *Conus*, a genus with which they are known to live: *Strombus* being a frugivorous animal with small and weak teeth, and *Conus* on the other hand being carnivorous, with very large and barbed teeth, provided with a poison bag and duct. It was suggested that this resemblance must tend greatly to the advantage of the *Strombus*, since the dangerous properties of *Conus* would tend to prevent its being touched by predatory fishes.—On the evidence as to the extent of earth movements and its bearing upon the question of the cause of glacial conditions, by the President. Prof. Hughes referred to the former paper in which he discussed the first part of the question, viz. the evidence of glacial conditions offered by scratched stones and smoothed and striated rock surfaces. He then stated the second part of the question in the same form as that in which the astronomical theory of the cause of recurrent glacial conditions is usually put forward. He contended that there is abundant evidence of contemporary earth movements of such a kind and magnitude as would, if their possible effects were not destroyed or modified by other causes, produce greater vicissitudes of temperature than any that are required to explain the most extreme glacial conditions observed in past time. An examination of the succession of events as recorded in the crust of the earth shows that these greater movements of elevation and depression have been secularly recurrent, and an inquiry into the geographical distribution of the formations which are held to contain evidence of glacial action leads to the conclusion that they are arranged round basins, and further that around the rim of these basins we have the clearest proofs from independent evidence of marginal movements of great intensity. The average fall of temperature as we ascend is observed to be about 1° F. for every 300 feet. Therefore the reduction of temperature due to such elevations as would result from known upheavals is quite sufficient to explain the occurrence of glaciation anywhere. A consideration of the geographical causes of glacial conditions explains why the effect has not always followed when the upheaval is known to have been great enough to have produced it: seeing that it is along the axes and areas of greatest movement that the greatest denudation takes place and the actual elevation represents only the excess of uplift over denudation.—On the fertilisation of some species of Medicago in England, by J. H. Burkill. The floral mechanism of four species of Medicago (*sativa*, L., *falcata*, L., *silvestris*, Fries, and *lupulina*, L., was discussed, and lists of insect-visitors given. The processes which unite the alae and carina hold the staminal tube in position in the unexploded flower, while the basal processes of the alae serve as triggers whereby an insect may explode it. The stigma is rendered fertile by rubbing as in Lotus, but in *M. lupulina* in older unexploded flowers becomes receptive and self-fertilised. Flies form a larger percentage of the insect-visitors in England than in Germany.—Contributions to the geology of the gosau beds of the Austrian Salzkammergut, by H. Kynaston.

Edinburgh.

Royal Society, February 5.—Prof. Copeland, Astronomer Royal for Scotland, in the chair.—Dr. John Murray gave an address on the floor of the ocean at great depths. He discussed the character of the deposits and the organisms found at the sea-bottom by the *Challenger* expedition. Exclusive of the *protozoa*, certain species were found in Antarctic waters which corresponded to species found in Arctic waters, while no such species were found in intervening tracts. This may be supposed to have been due to the production of the same species, from different origins, under the same conditions; but it is more in accordance with modern ideas to suppose that they had a common origin. Dr. Murray suggested that the common origin was referable to a period when the whole ocean had a fairly uniform high temperature of perhaps 70° or 80°. Under this condition there might have been a universal fauna. As the polar regions became colder, similar portions of the fauna became adapted to the like conditions of the northern and southern tracts; while the portion which was forced to retreat from the colder regions was now represented by the fauna of the coral reefs and tropical waters.

February 19.—Sir Douglas Maclagan, President, in the chair.—Mr. John Aitken read the third part of a paper on the number of dust-particles in the atmosphere of certain places in Great Britain and on the continent. Observations had been taken at Hyères, Cannes, and Mentone. There the air was never found to be very pure, the lowest number of dust-particles recorded being 600 per cubic centimetre. At the Italian lakes the conditions were found to be somewhat similar. When the wind blew up the slopes from the valleys, the number of dust-particles was greater than when it blew across the mountain tops. On the Righi it was also found that the air from the mountain was purer than the air from the plains. The haze increased with the number of particles. A connection was also observed between the amount of dust and the appearance of the sunset. When there was much dust, the light was warm and soft; when there was little, the lighting on the landscape was cold, clear, and sharp. A careful series of observations had also been taken at Kingairloch, which, along with others, had been used in the determination of constants in equations connecting the haze with number of dust particles, &c.—A paper, by Mr. George Romanes, containing a suggestion as to the probable nature of electrification, was communicated.

Paris.

Academy of Sciences, February 19.—M. Lœwy in the chair.—On linear equations of the second order containing an arbitrary parameter, by M. Émile Picard.—On certain developments in series, required in the theory of the propagation of heat, by M. H. Poincaré.—Typhoid fever in Paris, for the period 1884–1893; its autumn and winter increase. An abstract of a memoir, by M. de Pietra Santa, giving his conclusions concerning the general decrease of this disease and the causes of this decrease.—Observations of the new planet AV (Courty, 1894, February 11), made at the Paris Observatory, by M. G. Bigourdan.—Observations of the planet 1894, AV, made by the great equatorial of the Bordeaux Observatory, by MM. L. Picart and F. Courty.—Results of the solar observations made at the Royal Observatory of the Roman College during the fourth quarter of 1893, by M. P. Tacchini.—On the tetrahedra conjugate with respect to a quadric, and of which the edges are tangents to another quadric, by M. H. Vogt.—On a case of degeneration of a general projective system, by M. F. Engel.—On the movement of two points joined by a spring, by M. L. Lecornu.—On a system of two pendulums joined by an elastic thread, by M. Lucien de la Rive.—A new simplified method for the calculation of rapidly alternating currents, by M. A. Blondel.—The symmetrical aplanatic objective, by M. Ch. V. Zenger. The author has constructed systems of lenses imitating as far as possible the conditions obtaining in the human eye. He gives the necessary mathematical investigation. Two lenses, a plano-convex lens of phosphate crown glass, and a plano-concave of borate crown glass of less refracting and greater dispersive power, are combined to produce a system for which it is claimed, that (1) the achromatism is exact for the entire length of the spectrum;

(2) astigmatism is corrected very thoroughly; (3) spherical aberration, with a convenient aperture $\left(\frac{1}{F} = \frac{1}{20} \text{ to } \frac{1}{30}\right)$, is reduced to the minimum value of a second of arc; (4) the curvature of the field is absolutely corrected.—On the temperature of the higher regions of the atmosphere, by MM. Gustave Hermite and Georges Besançon. A reply to a criticism of a recent communication.—On the minimum electromotive force necessary for electrolysis to take place, by M. Max Le Blanc. The author claims priority over M. Nourrisson, and quotes some of his results from the *Zeitschrift physik. Chem.* 1891, p. 299.—Observations on the preceding note: the limits of electrolysis, by M. Berthelot. A memoir by the author published in 1882 ("Sur les limites de l'électrolyse," *Ann. Chim. Phys.* [5], 27, p. 88) carries the whole subject further than the papers by MM. Le Blanc and Nourrisson.—On the fusibility of isomorphous mixtures of some double carbonates, by M. H. Le Chatelier. A study of mixtures of sodium and potassium carbonates with calcium, strontium, and barium carbonates in such proportions that the alkaline carbonate and the alkaline-earthy carbonate are in equivalent quantities. Lithium carbonate behaves similarly to the alkaline-earthy carbonates.—On the allotropic transformation of iron under the influence of heat, by M. Georges Charpy. Conclusions are drawn from the experimental evidence quoted, indicating that the transformation is more rapid at more raised temperatures, but appreciable time is required, and hence duration of heating as well as temperature should be regarded in metallurgical operations.—Constitution of orcin, by M. de Forcrand. A thermal study; the results indicate that the phenolic hydroxyl groups occupy the meta position with regard to each other; the first has a slightly higher, the second the same thermal value as ordinary phenol.—On the ethylphenols, by MM. A. Béhal and E. Choay.—On the multirotation of sugars, by M. P. Th. Muller. The reaction producing the multirotation of sugars is of the first order; it proceeds in accordance with the law of the active masses. A constant at any given temperature measures the progress of the reaction. The speed of transformation is markedly greater for the pentoses than for the other sugars.—On the reciprocal affinities of the Myxosporidiæ, by M. P. Thélohan.—Researches on the structure of Mucorini, by MM. P. A. Dangeard and Maurice Léger.—On the *rôle* of *Plantago alpina* in mountain pastures, by M. E. Guinier.

Berlin.

Physiological Society, January 26.—Prof. du Bois Reymond, President, in the chair.—Dr. Dembo, of St. Petersburg, spoke on the physiological value of the various modes of slaughtering animals, and came to the conclusion that the most humane method consists in cutting the large blood-vessels of the neck. When this is done, unconsciousness sets in within a few seconds of the operation, while the movements made are merely symptoms of the cerebral anæmia. Further, the flesh of animals bled to death keeps best.—Dr. von Noorden gave an account of part of the experiments he has carried on in conjunction with Prof. Zuntz, on the action of quinine on the metabolism of man. With a constant diet extending over a long period, and after nitrogenous equilibrium was established, daily increasing doses of quinine were administered, with the result that during the time it was given, and for a day afterwards, the output of nitrogen was markedly lessened, but later on rose again to its initial value. Phosphorus showed the same falling off as did the nitrogen, whereas uric acid was only lessened in the period subsequent to the administration of quinine. Under the action of the drug the leucocytes diminished in number, but increased again later on. Careful investigation of the respiratory interchange showed a very slight but distinctly increased consumption of oxygen, probably to be explained entirely by the considerably increased ventilation of the lungs while the drug was being taken; this fell again subsequently to its normal magnitude. Dr. Ullmann, owing to the lateness of the hour, was only able to state his view that the red blood-corpuscles of man are spherical; he will give the basis for this view at a subsequent meeting.

February 9.—Prof. du Bois Reymond, President, in the chair.—Prof. Zuntz had made experiments with a Pettenkofer respiration apparatus at Göttingen, on the respiration by the skin and intestine of the horse. He first of all found that the total output of carbon dioxide in twenty-four hours was 4200 grm. Excluding that from the lungs, the remainder due to the skin and intestine amounted together to 145 grm., and an additional 22 grm., from volatile hydrocarbons. The latter can only be methane, and hence come from the intestine. Now since the gases of the intestine have a constant composition as regards methane, carbon dioxide and hydrogen, it became at once possible to calculate how much carbon dioxide comes from the skin, and how much from the intestine.

Physical Society, February 2.—Prof. Kundt, President, in the chair.—Prof. Goldstein spoke on the kathodic light, distinguishing the five following kinds of radiant rays:—(1) The yellow rays of the first zone, which are very strongly developed at the hinder side of the kathode, when there are holes in the latter. These rays are propagated in straight lines, are not affected by magnets, and exhibit no phosphorescence. (2) The rays of the second zone, which extend a long way into the space occupied by the kathodic light, may be concentrated by a bent kathode, are propagated in straight lines, are bent out of their course by a magnet, and are phosphorescent when they strike the inner wall of the tube. (3) The rays of the third zone, which are propagated uniformly in all directions, can turn a corner and throw no shadows. (4) A fourth kind of rays which produce inverted images of the electrode, and are arrested by screens. (5) A fifth kind is ordinarily invisible, but gives rise to bright stars where the rays fall on the wall of the tube. All the above five kinds of rays occur mixed in the light of the kathode, and intersect each other. In the "secondary negative light," which is developed when the tube in which the discharge takes place has constrictions on it, and which is seen at the end of the constriction turned towards the anode, Prof. Goldstein had observed two distinct kinds of kathodic light. Further, since the secondary negative light can pass over into the anodic light, the latter must also consist of kathodic rays. When a metallic plate with holes in it is placed in the middle of a vacuum tube, at whose ends the electrodes are inserted, he observed that artificial kathodic rays are produced on that side of the plate which is turned towards the anode. The above phenomena had been observed in air, nitrogen, oxygen, hydrogen, carbon dioxide, and mercury vapour, and were demonstrated at the end of the meeting.

Meteorological Society, February 13.—Prof. Hellmann, President, in the chair.—Prof. von Bezold spoke on the various modes of discriminating between clouds, as, for instance, by reference to their dimensional appearance, their form, structure, and height, and then proceeded to go very fully into their discrimination as based upon their mode of formation. Clouds are formed either as the result of cooling (resulting from either radiation or contact), or by mixing, or by adiabatic expansion (more strictly speaking, expansion with insufficient heat supply). Condensations resulting from cooling give rise to earth clouds and the various mist clouds which more rarely occur at higher levels. Stratus clouds result from mixing, as also do the overhanging caps of föhn clouds on mountain tops, the cloud-streamers of cumulus clouds, and more especially the cloud-waves at the junction between two winds which are passing each over the other. Adiabatic expansion gives rise to cumulus clouds. The speaker illustrated his remarks by a series of cloud-photographs and sketches.

DIARY OF SOCIETIES.

London.

THURSDAY, March 1.

Royal Society, at 4.30.—Preliminary Note on Bi-lateral Degeneration in the Spinal Cord of Monkeys (Macacus sinicus) following Uni-lateral Lesion of the Cortex Cerebri: Dr. E. L. Mellus.—On the Effect of Magnetisation upon the Dimensions of Wires and Rings of Annealed Iron: S. Bidwell, F.R.S.—On the Relations of the Secular Variation af the Magnetic Declination and Inclination at London, Cape of Good Hope, St. Helena, and Ascension Island, as exhibited on the Magnetarium: H. Wilde, F.R.S.—Terrestrial Refraction in the Western Himalayan Mountains: General Walker, F.R.S.—Researches on the Structure, Organisation, and Classification of the Fossil Reptilia—Part IX., Section 1, On the Therosuchia; Section 2, The Reputed Mammals from the Karroo Formation of Cape Colony: Section 3, On Diademodon; Section 5, On the Skeleton in New Cynodontia from the Karroo Rocks: Prof. Seeley, F.R.S.—On a Spherical Vortex: Prof. M. J. M. Hill.—On Correlation of certain External Parts of Palæmon serratus: H. Thompson.

Linnean Society, at 8.—Algological Notes from Cumbræ—On the Origin of the Filamentous Thallus of Dumontia filiformis: George Brebner.—Entomostraca and the Surface Film of Water: D. J. Scourfield.